

WHAT IS CLAIMED IS:

1. An ink jet printer comprising:

at least one ink chamber;

a print head having a plurality of ink jet nozzles and being connected to said ink chamber;

5 a print controller for driving said print head in order to print; and

a capping device for covering said ink jet nozzles of said print head, said capping device comprising:

10 a cap component having a plurality of cavities for sorting said ink jet nozzles into a plurality of nozzle groups by ink chamber unit, thereby capping all ink jet nozzles corresponding to at least one ink chamber by nozzle group unit;

15 a pipe being connected to said cavities of said cap component for supplying negative pressure to said cavities; and

a suction controller for controlling the supply of the negative pressure through said pipe to  
20 said cavities, thereby supplying the negative pressure independently by every cavity, whereby said

suction controller sucks the ink from said ink jet nozzles independently by the nozzle group unit.

2. An ink jet printer according to claim 1, wherein

said suction controller supplies the negative pressure to one

5 arbitrary cavity of said cap component so as to suck the ink from said ink jet nozzles independently by the nozzle group unit,  
and all remaining cavities which correspond to one common ink chamber with said arbitrary cavity are  
10 sealed.

3. An ink jet printer according to claim 1, wherein said suction controller supplies the negative pressure to all said cavities corresponding to one common ink chamber simultaneously.

4. An ink jet printer according to claim 1, wherein a plurality of said ink chambers are provided in said printer, and said cap component has a dimension and number of cavities for capping all  
5 of said ink jet nozzles connected to all ink chambers.

5. An ink jet printer according to claim 4,  
wherein said cap component comprises one of an  
integral unit and a plurality of sub-units divided  
according to the nozzle groups sorted by the ink  
5 chamber unit.

6. An ink jet printer according to claim 1,  
wherein a plurality of said ink chambers are  
provided in said printer, and said cap component  
does not have a dimension and number of cavities for  
5 capping all of said ink jet nozzles connected to all  
ink chambers, and said ink jet printer further  
comprising a second  
cap component capping all of said ink jet nozzles at  
a stretch.

7. An ink jet printer according to claim 1,  
wherein a plurality of said nozzle groups are  
arranged in a recording medium transporting  
direction.

8. An ink jet printer according to claim 1,  
wherein said suction controller receives clogged  
nozzle information indicative of a location of a

clogged nozzle, and controls the supply of the  
5 negative pressure in accordance with said clogged  
nozzle information.

9. An ink jet printer according to claim 8,  
wherein said clogged nozzle information includes  
information indicative of said ink chamber connected  
to the clogged nozzle, number of clogged nozzles,  
5 and a location of the clogged nozzle on said print  
head.

10. An ink jet printer according to claim 8,  
wherein said suction controller includes a selection  
table containing a plural number of control  
guidances corresponding to a variety of said clogged  
5 nozzle information, and controls the supply of the  
negative pressure in accordance with a specific  
control guidance, which correspond to said clogged  
nozzle information, selected from said selection  
table.

11. An ink jet printer according to claim 8,  
wherein said suction controller selects one of a  
selective suction mode and an all-nozzle suction  
mode in accordance with said clogged nozzle

5 information received, and when said selective  
suction mode is selected, said suction controller  
sucks the ink from at least one nozzle group  
selected from a plurality of nozzle groups, and when  
the all-nozzle suction mode is selected, said  
10 suction controller simultaneously sucks ink from all  
of said nozzle groups.

12. An ink jet printer according to claim 8,  
wherein said print controller includes a check  
pattern print portion for printing a predetermined  
clogging check pattern used for detecting a clogged  
5 nozzle by driving said print head.

13. An ink jet printer according to claim 12,  
further comprising a pattern reading device for  
reading said printed clogging check pattern to  
locate a clogged nozzle so as to send the resultant  
5 clogged nozzle information to said suction  
controller.

14. An ink jet printer according to claim 8,  
further comprising an input device, operated by a  
user, for entering the clogged nozzle information to  
said ink jet printer.

15. An ink jet printer according to claim 8,  
wherein said ink jet printer is connected to a host  
controlling device located outside of said ink jet  
printer, and said suction controller receives the  
5 clogged nozzle information from said host  
controlling device.

16. An ink jet printer according to claim 1,  
wherein said suction controller receives information  
designating one of a specific nozzle group and a  
specific cavity, and supplies the negative pressure  
5 to one of a cavity associated with said specific  
nozzle group and said specific cavity in accordance  
with said designating information.

17. An ink jet printer according to claim 1,  
wherein said ink jet printer is connected to a host  
controlling device located outside of said ink jet  
printer, and said suction controller receives said  
5 designating information from said host controlling  
device.

18. A printing system comprising:

1) an ink jet printer comprising:

at least one ink chamber;

a print head having a plurality of ink jet  
5 nozzles and being connected to said ink chamber;

a print controller for driving said print  
head in order to print; and

a capping device for covering said ink jet  
nozzles of said print head, said capping device  
10 comprising:

a cap component having a plurality of  
cavities for sorting said ink jet nozzles into a  
plurality of nozzle groups by ink chamber unit,  
thereby capping all ink jet nozzles corresponding to  
15 at least one ink chamber by nozzle group unit;

at least one pipe being connected to  
said cavities of said cap component for supplying  
negative pressure to said cavities; and

a suction controller for controlling  
20 the supply of the negative pressure through said  
pipe to said cavities, thereby supplying the  
negative pressure independently by every cavity,  
whereby said suction controller sucks the ink from  
said ink jet nozzles independently by the nozzle  
25 group unit; and

2) a host controlling device for controlling  
said ink jet printer, said host controlling device  
sending to said ink jet printer selection  
information necessary for selecting one nozzle group  
30 to be sucked with the ink therefrom.

19. A printing system according to claim 18,  
wherein said host controlling device comprises:

a commanding portion for commanding said ink  
jet printer to print a predetermined clogging check  
5 pattern;

user input means by which a user enters user  
input information indicative of clogged nozzle  
information; and

a selection information generator for  
10 generating said selection information based on said  
user input information entered by said user input  
means.

20. A printing system according to claim 18,  
wherein said user interface displays a clogging  
check pattern image on a user interface screen of  
said host controlling device, and the user enters  
5 said user input information by pointing a location



on said displayed clogging check pattern image,  
which corresponds to a location of the clogged  
nozzle.

21. A data storing medium, accessible by a  
computer, storing a program for executing a process  
to detect a defective dot forming element in dot  
forming elements in a printer, wherein said process  
5 comprising the steps of:

instructing said printer to print a  
predetermined clogging check pattern;

displaying a clogging check pattern image on a  
user interface screen of said computer; and

10 specifying said defective dot forming element  
in a manner that a user points to a location in said  
displayed clogging check pattern image, which  
corresponds to said defective dot forming element.

22. A data storing medium, accessible by a  
computer, storing a program for executing a process  
to instruct an ink jet printer having a plurality of  
ink jet nozzles to clean said ink jet nozzles,

5        wherein said ink jet printer selectively performs one of an ink saving cleaning process and a normal cleaning process,

         wherein said ink saving cleaning process is executed through a selective suction operation to  
10    suck ink from only at least one ink jet nozzle selected from said ink jet nozzles, and said normal cleaning process is executed through a all-nozzle suction operation for simultaneously sucking the ink from all of said ink jet nozzles at any time; and

15        said cleaning instruction process comprising the steps of:

         displaying an image requesting a user to select one of a saving mode corresponding to said ink saving cleaning process and a normal mode  
20    corresponding to said normal cleaning process on a user interface screen of said computer;

         instructing said ink jet printer to execute said ink saving cleaning process when the user selects said saving mode selected on the image  
25    displayed on the user interface screen; and

         instructing said ink jet printer to execute said normal cleaning process when the user selects

said normal mode selected on the image displayed on the user interface screen.

23. A method for controlling an ink jet printer comprising a print head having a plurality of ink jet nozzles sorted into a plurality of nozzle groups, and a capping device for selectively sucking  
5 ink from said nozzle groups by selectively capping said nozzle groups, said method comprising the steps of:

printing a predetermined clogging check pattern and causing a user to detect a clogged nozzle;

10 visually presenting a clogging check pattern image to the user;

obtaining clogged nozzle information indicative of said clogged nozzle in a manner that the user points to a location in said displayed clogging  
15 check pattern image, which corresponds to said clogged nozzle in said printed clogging check pattern;

selecting one nozzle group from said nozzle groups based on said clogged nozzle information  
20 obtained; and

sucking the ink from said clogged nozzle in said selected nozzle group.

24. An ink jet recording apparatus comprising:

a ink jet recording head for discharging ink droplets through nozzle openings upon receiving ink supply from an ink cartridge;

5       capping means for sealing said recording head to absorb ink droplets through the nozzle openings;

          a valve unit arranged between said ink cartridge and said nozzle openings of the recording head for opening and closing an ink supply path  
10       between the ink cartridge and the nozzle openings;  
and

          valve opening/closing control means for controlling opening and closing of said valve unit in accordance with the cleaning operation to absorb  
15       ink droplets through the nozzle openings, with sealing the nozzle openings of the recording head with said capping means.

25. An ink jet recording apparatus comprising:

ink jet recording heads for discharging different color ink droplets through each nozzle opening upon receiving ink from the ink cartridges;

5           capping means for sealing each nozzle opening of said recording head to absorb ink droplets through the nozzle openings;

          a plurality of valve units arranged between said ink cartridges and each nozzle opening  
10 of the recording head for opening and closing the ink supply paths between the ink cartridges and each nozzle opening; and

          valve opening/closing control means for controlling said valve units to open and close  
15 valves in accordance with the cleaning operation to absorb ink droplets through the nozzle openings, with sealing the nozzle openings of the recording head with said capping means.

26. An ink jet recording apparatus as claimed in claim 25, wherein said valve opening/closing control unit can select from several modes, full-open mode for opening all valve units, full-close  
5 mode for closing all valve units, and alternative

open mode for opening only one valve unit alternatively.

27. An ink jet recording apparatus as claimed in claim 26, wherein said each valve unit interlocks with rotational drive of an actuator to select one mode from said full-open mode, full-close mode, and  
5 alternative open mode.

28. An ink jet recording apparatus as claimed in claim 25, wherein said valve units are arranged in a black ink supply path, a cyan ink supply path, a magenta ink supply path, and a yellow ink supply  
5 path respectively.

29. An ink jet recording apparatus as claimed in claim 24, wherein said valve units are mounted on a carriage together with said ink cartridges and said recording head, and reciprocate along a guide  
5 member.

30. An ink jet recording apparatus as claimed in claim 24, wherein head filters are disposed in the ink supply paths between said valve units and said nozzle openings of the recording head.

31. An ink jet recording apparatus as claimed  
in claim 24, wherein said valve units are arranged  
such that at least a pair of ink connecting holes  
penetrate crossing the axis direction of the shaft,  
5 disposed across said ink supply paths.

32. An ink jet recording apparatus as claimed  
in claim 25, wherein said capping means is formed  
with a single capping member capable of sealing all  
nozzle openings for discharging different color inks  
5 respectively.

33. A recording head cleaning method in an ink  
jet recording apparatus comprising:

an ink jet recording head for discharging ink  
droplets upon receiving ink supply from an ink  
5 cartridge;

capping means for sealing said recording head  
to absorb ink droplets through nozzle openings; and

a valve unit arranged between said ink  
cartridge and said nozzle openings of the recording  
10 head for opening and closing the ink supply path  
between the ink cartridge and the nozzle openings,

and the recording head cleaning method in an ink jet recording comprising the steps of:

sealing the nozzle openings of the recording head with said capping means in a state closing said valve unit and applying negative pressure into the capping means;

in said step, with applying negative pressure into the capping means, opening said valve unit to absorb ink from the nozzle openings of the recording head.

34. A recording head cleaning method in an ink jet recording apparatus as claimed in claim 33, executing the steps:

closing the valve unit following said ink absorbing step,

further closing the valve unit for preventing air bubbles formed with discharged ink within the capping means in said ink absorbing step, from being pulled into the nozzle openings of the recording head.

35. A recording head cleaning method in an ink jet recording apparatus comprising:



an ink jet recording head for discharging  
different color ink droplets through each nozzle  
5 opening upon receiving ink from the ink cartridges;

capping means for sealing each nozzle opening  
of said recording head to absorb ink droplets  
through the nozzle openings; and

a plurality of valve units arranged between  
10 said ink cartridges and each nozzle opening of the  
recording head for opening and closing the ink  
supply paths between the ink cartridges and each  
nozzle openings,

and the recording head cleaning method in an  
15 ink jet recording apparatus comprising the steps of:

sealing the nozzle openings of the recording  
head with said capping means in a state closing said  
valve units and applying negative pressure into the  
capping means;

20 in said step, with applying negative pressure  
into the capping means, opening said all or a part  
of valve units to absorb ink through the nozzle  
openings of the recording head.

36. A recording head cleaning method in an ink jet recording apparatus as claimed in claim 35, executing the steps:

closing all valve units following said ink  
5 absorbing step, further closing valve units for preventing air bubbles formed with discharged ink within the capping means in said ink absorbing step, from being pulled into the nozzle openings of the recording head.